

REMARKS

Claims 4, 9, and 21-34 are pending in the application. This amendment corrects the format of the original application to comply with 37 CFR 1.173. Specifically, claims 1-9 of the present application are amended to reference claims 1-9 of U.S. Patent No. 5,866,846, of which the present application is a reissue. Previously presented claims 10-20 have been cancelled.

All of the new claims and claim amendments are supported by the original patent specification at col. 6, lines 42-64 and Figures 3, 10, and 13. Additional specification and drawing support can be provided if needed.

As a preliminary matter, Applicant submits that claim 4 as herein provided is in the exact form as was originally provided in parent reissue application U.S. Ser. No. 09/776,394. Therefore, the copy of the Reissue Declaration and Consent of Assignee filed with the present application should be sufficient.

Applicant would now like to address the pending claims in light of the prior art.

Claims 4, 21, and 32

Claim 4 provides a method for forming “concave surfaces” in endplates of confronting vertebral bodies and inserting a motion-preserving endoprosthesis therein. Claim 21 provides a method of forming “partially hemispherical surfaces” in endplates of confronting vertebral bodies and inserting a motion-preserving prosthesis therein. Claim 29 provides a method of forming a surface that is “arcuate in multiple planes” in an endplate of a vertebral body and inserting a motion-preserving prosthesis therein. Claim 32 provides a method of “milling an endplate of the vertebral body to a relatively shallow thickness as compared to an overall thickness of the vertebral body” and inserting a motion-preserving implant therein.

With respect to claims 4, 21, and 32, Applicants submit that they have invented a unique method of forming/milling the endplate of a vertebral body for receiving a motion-preserving type of implant or prosthesis. Fusion type implants, such as is described in Michelson (U.S.

Patent 5,015,247), can accommodate milling operations because of the nature of bone fusion, which strengthens the intervertebral space.¹ Motion preserving type implants do not have the extra strength as compared to fusion type implants. Also, the allowed freedom of motion by motion-preserving type implants further requires a very strong and stable attachment to the corresponding vertebral body. Therefore it has heretofore been disadvantageous to mill or shape the vertebral body endplates when inserting motion-preserving type implants. In contrast, the claimed shapes formed in the endplates of the present claims provide a larger, distributed contact area with minimal invasion of the vertebral body so that they work well with motion-preserving type implants.

It is noted that Monson (USP 4,863,477) is very careful to preserve the vertebral body endplates.² Bainville (USP 5,674,294) teaches an implant with a compressible cushion 11 which inherently allows it to be compressed and inserted into the disc space. (col. 3, lines 33-37). Neither of these references teach any type of milling or endplate manipulation. Therefore, there is no motivation to combine these references with the Michelson patent.

Claims 9 and 24

Claim 9 provides a method for forming surfaces in adjacent vertebral bodies that are “concave about multiple planes.” Claim 24 provides a method of inserting an intervertebral disc prosthesis by forming an indentation in an endplate of a vertebral body. The indentation has “a middle portion and a circumferential rim such that the middle portion is deeper into the first vertebral body than any part of the circumferential rim.” Forming such an indentation and/or multiple-concave surface has several unique benefits. For one, the stronger cortical rim of the vertebral body endplate is left more in tact, as compared to the softer interior portion of the endplate, than as compared to the prior art.

¹ Michelson teaches against having motion in the disc space. (See col. 10, lines 53-56).

² Monson teaches inserting the implant and then inflating it so that it will conform to the endplates. (See col. 1, line 66 – col. 2, line 8).

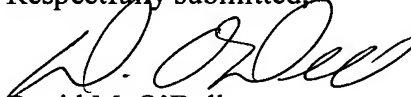
This helps to stabilize the implant throughout the entire axial plane of movement. In contrast, the boring instrument (drill 22) of the Michelson patent will adversely remove part of the cortical rim and will only be concave in one plane. As a result, the implant is not as secure. Depending on the approach (e.g., posterior) used with the Michelson drill, there will be a danger of later movement by the implant in the same direction used for the approach.

Conclusion

Applicants submit that the claimed features are not only unique, but provide a significant advancement in the art. Therefore, claims 4, 9, 21, 24, and 32 are deemed to be in condition for allowance. Furthermore, claims 22-23, and 25-31, and 33-34 further limit their respective independent claims in a patentable sense, and provide further unique limitations when considering the claims as a whole.

Should the Examiner deem that any further amendment is desirable to place this application in condition for allowance, the Examiner is invited to telephone the undersigned at the below listed telephone number.

Respectfully submitted,



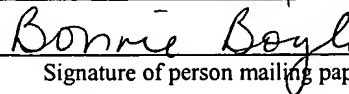
David M. O'Dell

Registration No. 42,044

Dated: Dec. 15, 2004
HAYNES AND BOONE, LLP
901 Main Street, Suite 3100
Dallas, Texas 75202-3789
Telephone: 972/739-8635
Facsimile: 214/200-0853
Client Ref. No. PC904.08
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